1. A chemistry lab manual slides off a horizontal table top with a speed of 2.25 m/s. It strikes the floor in 0.6 s. How far away from the table did it land? How tall is the table?

**Representations (graphs, motion maps, sketches with variables labeled)**

**Variables and Equations**

**Solution (show all reasoning and/or math)**

**Reasonability check**

1. A picnic basket falls out of a hot air balloon that is traveling horizontally at 14 m/s. The hot air balloon is at an altitude of 325 m. Where does the picnic basket land relative to where it was dropped from?

**Representations (graphs, motion maps, sketches with variables labeled)**

**Variables and Equations**

**Solution (show all reasoning and/or math)**

**Reasonability check**

1. A boy throws a marshmallow that it lands in his friend’s mouth 4 m away. The boy threw the marshmallow at an angle of 30°. Assume that the throwing height is the same as the friend’s mouth. Solve for the initial velocity vector components of the marshmallow.

# Representations (graphs, motion maps, sketches with variables labeled)

# Variables and Equations

# Solution (show all reasoning and/or math)

# Reasonability check

1. On the open seas, a cannonball is shot from a cannon at 12 m/s at an angle of 35° above horizontal. It leaves the cannon on the ships deck 4 m above the ocean and lands on another ship’s deck 2 m above the ocean. What is the final velocity (in components) of the cannonball? How much time does it take to get there?

**Representations (graphs, motion maps, sketches with variables labeled)**

**Variables and Equations**

**Solution (show all reasoning and/or math)**

**Reasonability check**

5. A boat leaves the dock at t = 0 and heads out into a lake with an acceleration of . A strong wind is pushing the boat, giving it an additional velocity of . (a) What is the velocity of the boat at t = 10 s? (b) What is the position of the boat at t = 10 s? (c) Draw a sketch of the boat’s trajectory and position at t = 10 s, showing the x- and y-axes.

**Representations (graphs, motion maps, sketches with variables labeled)**

**Variables and Equations**

**Solution (show all reasoning and/or math)**

**Reasonability check**